

SPECIFICATION

Please make the following amendments to the specification:

At line 5, amend paragraph [0005] as follows:

[0005] Unfortunately, the resulting model may be imprecise due to the manner of its handling of depressions and their inherent characteristics. Depressions are areas where the source cell is lower than all eight of its neighbors. These are depressions in the DEM where water will pond. Some programs raise the elevation of the depression digitally in an effort to determine flow direction. As a result, such programs artificially fill all depressions so that inaccurate elevations are created below the calculated outlets.

At line 3, amend paragraph [0026] as follows:

[0026] After FAUCET makes a first pass at fixing all of the problems, the flow vectors are recalculated for the buffered array at 2110 and examined again at 2120. If it is determined that problems still remain in the center cell's extents at 2130, FAUCET once again tries to fix all of the depressions at 2140, followed by the flat areas at 2150 and then the peaks at 2160.

At lines 1 and 3, amend paragraph [0028] as follows:

[0028] Flow vectors are represented by an integer ranging from "0" to "[8]9". The number assigned to each cell in the array signifies either a flow direction (in the case of numbers "1" to "[8]9"), as shown in FIG. 5, or that the minor cell is a problem cell (in the case of a "0"). These flow vector numbers are associated with each respective minor cell in the array by means of storage in a flow vector file. FIG. 6 illustrates how flow vectors are calculated for an array of elevations. The routine checks each minor cell in the buffered array in no particular order, since the order is not important. Initially, the

cell under scrutiny is checked at 3010 to see if it is located at the outermost edge of the buffered array at 3020. If it is on the edge, a value of “0” is assigned to this cell, flagging it as a problem or “zero-vector” cell, and the process proceeds to check the next minor cell. The reason that a cell on the edge is a problem is because it is impossible to examine all eight of its neighbors to determine a flow direction based on the D8 method described below. However, this is not a major difficulty since the process is only concerned with fixing problems in the center cell, and any buffer edge problems will be at the extents of the surrounding buffer cells. The minor cell is then examined at 3030 to ascertain if a flow vector can be assigned using the D8 criteria known in the art according to which water will flow from one cell to an immediate neighbor cell having the steepest downstream slope or, phrased differently, the largest negative slope. If a cell does not have a distinct flow to which to apply these criteria, such as in the case of a cell in a depression, flat area or peak, that cell is also assigned a zero flow vector value at 3050. All cells having “0” assigned flow vector values are referred to as zero-vector cells. If a slope can be determined using the D8 rules, the appropriate flow vector number is assigned to that cell at 3060. Processing then continues at 3070 where a determination is made whether all minor cells in the elevation array have been assigned a flow vector. If not, processing returns to 3010.

At line 22, amend paragraph [0029] as follows:

[0029] Once the initial flow vectors have been calculated for the buffered array and it has been determined that there are problems in the center cell, FAUCET first attempts to fix any depressions. FIG. 7 is a flowchart illustrating the overall process for fixing depressions. First, a Boolean array corresponding to the elevation array is created at 4010 to flag any problem cells that are determined to be unfixable. Then a variable is

initialized at 4020 to keep track of the highest depression found. The importance of this variable will become apparent below since the depression fixing routine starts by fixing the highest depression areas first in order to better handle situations involving nested depressions. At 4030, a successive search of stored flow vector data relating to the minor cells within the center cell's extents is begun to identify zero vector cells. Each minor cell of the selected major cell is successively examined moving from left to right, lower row to upper row throughout the selected major cell in order to find and eventually "fix" zero vector cells. Note that the order in which cells are examined is not important for purposes of properly completing the described process. If a minor cell has a zero vector value, as determined at 4040, it is further examined at 4050 to ascertain if that cell has a problem that has already been deemed to be unfixable. If not, the elevation of that cell undergoes further review at 4060 to determine if it is -9999 (a NoData cell). If so, it is flagged as unfixable at 4070. In the event minor cells are encountered which are either not zero vector cells, are unfixable or are NoData cells, data, if any, for the next cell is retrieved at 4030. If a cell is a zero vector cell and is neither unfixable nor a NoData cell, a test is performed at 4080 to determine the cause of the flow problem. This process is illustrated in FIG. [[5]] 8, discussed below. If it is determined that the zero-vector is caused by a depression at 4090, the elevation of the zero vector cell under consideration is compared to the elevation of the highest depression already found, if any, at 4100. If the depression being examined is higher than the highest depression already found, then the variable storing the highest depression is modified at 4110 to reflect this minor cell. If all minor cells have not been checked for depressions at 4120, then processing continues at 4030 to retrieve the next zero vector cell that is in a depression. Once all cells in depressions have been identified and examined, a check is performed at 4130 to determine if the flag has been set at 4110 indicating that a cell has been identified as

having the highest depression elevation. If so, processing is transferred at 4140 to the routine for fixing depressions that is illustrated and discussed with respect to FIG. 9 below. If the depression-fixing routine successfully fixes the depression, as determined at 4150, the flow vectors are recalculated for this area at 4160, the highest depression variable is reset at 4020, and FAUCET starts searching through the center cell's extents again at 4030 to determine the next highest remaining depression. If the depression-fixing routine is unsuccessful, this minor cell is flagged as unfixable at 4170, the highest depression variable is reset at 4020, and the process attempts to look for the next highest depression at 4030. This process continues until all minor cells that are determined to be depressions in the center cell's extents have been fixed or are deemed unfixable, both of which are indicated if the flag at 4130 is not set, at which point FAUCET exits this routine and moves on to fixing flat areas.

At line 12, amend paragraph [0039] as follows:

[0039] The method of this invention is compatible with most other hydrologic and hydraulic models and provides tools to evaluate flow vectors in a given topology in the context of those models while also providing the user the capability to easily develop "what if" scenarios. In order to practice the method of this invention, a computer system is required having an operating system such as Windows 98, Windows 2000 or Windows NT. This computer can be run either as a single station system or a networked system and can be installed on a desktop, laptop or notepad computer so long as the computer has a minimum of 128 megabytes of RAM, 150 megabytes of storage space on a hard drive; at least a Pentium class processor, video display resolution of at least 800 x 600 with a minimum of 256 colors. It would also be useful for the installed computer system to be Internet accessible through Microsoft Internet Explorer 5.5 or higher. Furthermore, use

of the ~~use of the~~ method of this invention assumes the preexistence of and access to stored databases, GIS shapefiles and survey data from which data is extracted and used to create TIN's and/or DEM's, as required. The data may be in a large variety of formats, including, but not limited to, LIDAR data, AutoCAD DXF's, shapefiles and numerous versions of ASCII such as ArcInfo-generated Grid ASCII files.